

Two new and two known species of *Sphaerophoria* St. Fargeau and Serville, 1828

(Dipt. Syrphidae)

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Sphaerophoria vockerothi sp. nov. and *Sphaerophoria assamensis* sp. nov. are described from India; the former also from Taiwan. The lectotype of *Sphaerophoria viridaenea* Brunetti is designated. *Sphaerophoria brunettii* Joseph is synonymized with *Sphaerophoria scripta* (L.).

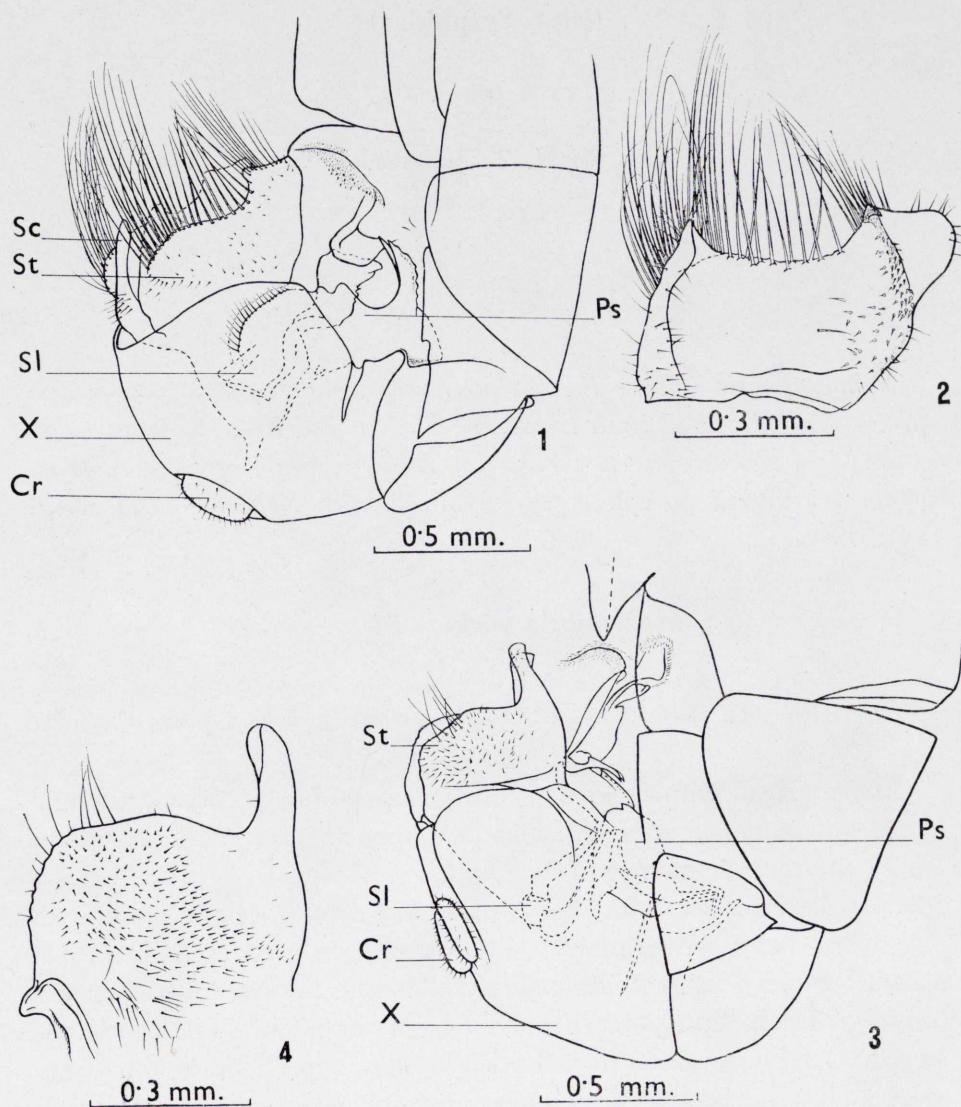
Sphaerophoria vockerothi sp. nov.

Holotype ♂ from Kimin, 198 m., Subansiri Frontier Division, NEFA, 11-V-1966 (Reg. No. 4282/H6, Zoological Survey of India, Calcutta).

Male. Head with frons and face yellow-pollinose; ocellar triangle black, supraantennal area with a small triangular black mark, at certain angles the central tubercle of face appears marked with a small black spot; ocellar triangle with black hairs; face bare; occiput black with pale hairs, hairs dense immediately posterior to ocellar triangle, side margins covered with white pollen and white tomentum. Proboscis brown to black, tip paler. Front facets of compound eyes a little enlarged. Antenna yellow to yellowish-orange, upper side of third segment and arista brown; first and second segments with minute black setae towards the distal margin.

Thorax shining black with yellow to yellowish-brown (lemon yellow in specimens from Taiwan) callus-like marks as follows: lateral border of mesonotum from humerus to scutellum, most of mesopleuron from top to bottom, a horizontal spot on sternopleuron, a triangular area on pteropleuron below the wing root, supraspiracular area, mesothoracic spiracular area, and a spot on propleuron; all but the last of

these yellow markings contiguous. Mesonotum with two longitudinal greyish stripes. Scutellum yellow to yellowish-brown (lemon yellow in



Figs. 1-4.—*Sphaerophoria vockerothi* sp. nov.: 1) tip of ♂ abdomen showing genitalia; 2) inner view of style. *Sph. assamensis* sp. nov.: 3) tip of ♂ abdomen showing genitalia; 4) inner view of style. (Cr. = cercus; Ps. = penis; Sc. = sternal cornua; Sl. = superior lobe; St. = style; X = tenth segment).

specimens from Taiwan). Hairs of thorax pale, those on yellow surface yellow; scutellum with black and yellow hairs.

Abdomen yellow with transverse black bands. Tergite 1 shining

black, bright yellow to yellowish-brown at sides; tergite 2 bright yellow to yellowish-brown with shining black to brownish anterior and posterior transverse bands, yellow surface often with brownish to dark brown marks of varying extent so as to occupy a little to most of the surface; tergites 3 and 4 similar to the preceding segment, more often transverse anterior and posterior bands paler; in some examples hind border of tergite 1 and both anterior and posterior extreme borders of tergites 2-4 narrowly bright yellow, yellow or yellowish-brown; tergite 5 yellowish-brown to brownish with brown to dark brown marks. Tergites medially black haired and laterally pale haired, pale hairs of two basal segments longer; sternites pale haired. Genitalia (Figs. 1, 2): penis with a pair of well developed processes at its base; superior lobe with a row of well developed hairs decreasing in size from tip to base.

Wing hyaline, stigma brownish. Haltere yellow to yellowish-orange, stem paler.

Fore and mid legs yellow, their tarsi yellow to yellowish-brown; hind leg yellow, tarsus yellowish-brown with upper side of 4 and 5 segments black. Fore leg pale haired, femur with or without a few minute black hairs dorsally towards the tip; mid coxa and trochanter pale haired, femur with pale and black hairs, the black hairs on the posterior surface forming one to two rows extending from just beyond base or from near middle almost to apex, tibia and tarsus pale haired; hind coxa and trochanter pale haired, the latter at times with a few black setae, femur with black and pale hairs, tibia and tarsus more or less black haired dorsally as well as laterally, pale haired ventrally, first and second tarsomeres of some specimens from Taiwan almost wholly pale haired.

Female. Similar to male, differing as follows: from vertex to base of antennae with a broad shining black stripe which bears pale hairs distally and black hairs proximally; abdominal tergites 5 and 6 with a broad median longitudinal dark band extending from hind border to anterior margin, in specimens from Taiwan most of the surface dark, anterior margin with or without dark border; tergite 7 wholly dark brown to black; tergites 3-7 wholly black haired; hind tarsi with fewer black setae.

Length. ♂, 6-7 mm. ♀, 6-7 mm.

Types. Holotype, ♂, Kimin, 198 m., Subansiri Frontier Division, NEFA, 11.V.1966, Reg. No. 4282/H6, Zoological Survey of India, Calcutta. Paratypes, 2 ♂♂, Tipi, 213 m., Kameng Frontier Di-

vision, NEFA, 3.V.1966, Reg. No. 4283/H6, 4284/H6; 2 ♀ ♀, 3 ♂ ♂, Pinjuli, 244 m, Kameng Frontier Division, NEFA, 4.V.1966, Reg. No. 4285/H6 to 4289/H6; 2 ♂ ♂, Kimin, 198 m., Subansiri Frontier Division, NEFA, 9.v.1966, Reg. No. 4290/H6, 4291/H6; 8 ♂ ♂, Kimin, 198 m., Subansiri Frontier Division, NEFA 11.V.1966, Reg. No. 4292/H6 to 4299/H6; 1 ♀, Tamen, 457 m., Subansiri Frontier Division, NEFA, 18.V.1966, Reg. No. 4300/H6; 2 ♂ ♂, Tamen, 305 m., Subansiri Frontier Division, NEFA, 19.V.1966, Reg. No. 4301/H6, 4302/H6; 4 ♂ ♂, Chukru, 1128 m., Subansiri Frontier Division, NEFA, 22.V.1966, Reg. No. 4303/H6 to 4306/H6; Zoological Survey of India, Calcutta. Coll. A. N. T. Joseph. 2 ♀ ♀, Houli near Taichung, Taiwan, 12.VIII.1968; 5 ♂ ♂, 2 ♀ ♀, Sun Moon Lake, Taiwan, 13.VIII.1968; Canadian National Collection, Ottawa. 1 ♂, 1 ♀, Houli near Taichung, Taiwan, 12.VII.1968, United States National Museum, Washington. All the specimens from Taiwan were collected by J. W. Boyes.

Discussion. *Sphaerophoria vockerothi* sp. nov. is related to *Sphaerophoria indiana* Bigot, but it can be easily separated by the shape of the style and of the penis base, and by the shape as well as the well developed marginal row of hairs of the superior lobe. It is readily told from other similar species including *Sphaerophoria indiana* Bigot by the presence of a pair of long processes arising from the base of penis.

The species is named in honour of Dr. J. R. Vockeroth, without whose help it would not have been possible to work out the material.

Sphaerophoria assamensis sp. nov.

Holotype ♂ from Dunn Bridge, 1524 m. Kameng Frontier Division, NEFA, 21-IV-1966 (Reg. núm. 4269/H6, Zoological Survey of India, Calcutta).

Male. Head with frons and face yellow-pollinose; ocellar triangle, a triangular supraantennal area and median facial stripe shining black; ocellar triangle black haired; yellow pollinose front and face pale haired; occiput black with pale hairs, hairs dense immediately posterior to ocellar triangle; side margins of occiput black, covered with white pollen and white tomentum. Proboscis, black, tip palear. Front facets of compound eyes slightly enlarged. Antenna yellow to yellowish-orange,

upper side of third segment and arista brown; first and second segments with minute black setae towards the distal margin.

Thorax shining black with the following bright yellow to yellowish-brown callus-like marks: lateral border of mesonotum from humerus to suture, a large area from top to bottom of mesopleuron, a horizontal spot on sternopleuron, all contiguous; metathoracic spiracular area, supraspiracular area, a small triangular area anterior to it below the wing root on pteropleuron, all contiguous; and a spot on propleuron. Scutellum bright yellow to yellowish-brown. Hairs of thorax pale, those on yellow areas yellow with a few black hairs at the hind margin of scutellum.

Abdomen yellow with transverse black bands. Tergite 1 shining black, bright yellow to yellowish-brown at sides; tergite 2 bright yellow to yellowish-brown with broad black anterior and posterior bands; tergites 3 and 4 similar to the preceding tergite, their black bands slightly paler; tergite 5 yellowish-brown to brownish with brown to dark brown marks. Sternites pale yellow to yellowish-brown with brownish to dark brown marks. Tergites black haired medially, tergite 5 with a conspicuous cluster of black hairs at middle; tergites laterally pale haired, the hairs of two basal segments longer; sternites pale haired. Genitalia (Fig. 3) with cerci lodged in a notch in tenth segment; style (Fig. 4) without sternal cornua, inner side with abundant hairs.

Wing hyaline, stigma brownish. Haltere yellowish-orange to brownish, stem paler.

Fore leg yellow, tarsus yellow to yellowish-brown; mid leg similar; hind coxa and trochanter yellow to yellowish-brown, femur yellow with or without pale yellowish-brown on dorsal side from middle to tip, tibia yellow, with or without pale yellowish-brown marks, tarsus dark brown, metatarsus lighter coloured with its ventral side yellow, dorsal side of segments 4 and 5 black, ventral side yellowish to gray. In one example (Reg. No. 4274/H6) coxae and trochanters of all legs more or less dark brown. Fore leg pale haired; mid coxa and trochanter pale haired, femur with black and pale hairs, black hairs long and forming two to three rows on the posterior surface extending from just beyond base or from near middle to apex, tibia pale haired with a few basal black hairs and a few strong black hairs; hind coxa almost wholly pale haired, trochanter with black and pale hairs, femur mostly black haired, tibia mostly black haired but more or less pale haired ventrally, tarsus black haired dorsally and laterally, pale haired ventrally.

Female. Similar to male, differing as follows: frons with a few black hairs lateral to the antennae and a broad shining black band from vertex to antennal base, the band bearing black hairs; scutellum black haired with a few pale hairs at the borders; abdominal tergite 1 completely shining black, tergites 2-4 with dark bands shining black, with the posterior bands narrowly bordered at rear end by pale yellow, tergite 5 shining black with its hind margin narrowly pale yellow and sides yellowish-brown, tergites 6 and 7 similar to tergite 5; hind tarsus black, fore and mid legs with black and pale hairs except on their coxae, hind tibia black haired.

Length. ♂, 7-8 mm. ♀, 7.5 mm.

Types. Holotype, ♂, Dunn Bridge, 1524 m., Kameng Frontier Division, NEFA, 21.IV.1966, Reg. No. 4269/H6, Zoological Survey of India, Calcutta. Paratypes, 2 ♂♂, Tamen, 457 m., Subansiri Frontier Division, NEFA, 18.V.1966, Reg. No. 4270/H6, 4271/H6; 1 ♂, Tamen, 305 m., Subansiri Frontier Division, NEFA, 18.V.1966, Reg. No. 4272/H6 (*); 2 ♂♂, Tamen, 305 m., Subansiri Frontier Division, NEFA, 19.V.1966, Reg. No. 4273/H6 (*), 4274/H6; 1 ♂, Tamen, 457 m., Subansiri Frontier Division, NEFA, 20.V.1966, Reg. No. 4275/H6; 1 ♂, Chukru, 1128 m., Subansiri Frontier Division, NEFA, 22.V.1966, Reg. No. 4276/H6; 1 ♀, Tawang, 3200 m., Kameng Frontier Division, NEFA, 27.IV.1966, Reg. No. 4277/H6; Zoological Survey of India, Calcutta. Coll. A. N. T. Joseph.

Discussion. *Sphaerophoria assamensis* sp. nov. is similar to *Sphaerophoria viridaenea* Brunetti and *Sphaerophoria novaeangliae* Johnson in that the anal cerci are located in a notch and not surrounded by the tenth segment. In Brunetti's key to species of *Sphaerophoria* (1923), *Sphaerophoria assamensis* sp. nov. runs to *Sphaerophoria viridaenea* Brunetti with which it is mostly related. *Sphaerophoria assamensis* sp. nov. differs from the latter in the shape of the superior lobe and in the characteristic style.

(*) Donated to Canadian National Collection, Ottawa.

Sphaerophoria viridaenea Brunetti, 1915.

- Sphaerophoria viridaenea* Brunetti, 1915. *Rec. Indian Mus.*, t. XI, páginas 216-217 (Simla; Theog; Kurseong).
Sphaerophoria viridaenea Brunetti, Brunetti, 1923. *Fauna British India, Diptera*, t. III, págs. 101-102, lám. III, figs. 7-8.
Sphaerophoria viridaenea Brunetti, Joseph, 1967. *Oriental Insects*, t. I, pág. 247, figs. 5-7.

The author has studied this species in detail earlier (1967). The types are designated here. Lectotype, ♂, Simla, 2134 m., 16.V.1909, Reg. No. 2278/H2, Coll. N. Annandale; one wing missing. Paralectotype, ♀, Kurseong, 1525 m. E. Himalaya, 4.IX.1909, Reg. No. 9750/H2, Coll. N. Annandale; damaged. Brunetti (1923) based his redescription on two females and one male; one of these females bore the same data as the female originally described. It is not clear whether he based his redescription on the original specimen or on another specimen bearing the same data. Since there is only one specimen bearing this data in the Zoological Survey of India Collections and all the specimens are deposited in the Zoological Survey of India Collections, it is presumed that both the descriptions were based on the same specimen and it has been designated as paralectotype.

Brunetti (1915) erected the species on 2 males and 1 female. He also mentions a type locality — Kurseong — along with male types without giving further details. It has not been possible to locate the specimen in the Zoological Survey of India Collections. Genitalic study shows that the remaining male specimen, Theog., 2438 m., Simla Hills, 2.V.1907, Reg. No. 2279/H2, Coll. N. Annandale, is *Sphaerophoria nigratarsis* Brunetti.

Sphaerophoria scripta (Linnaeus, 1758).

- Musca scripta* Linnaeus, 1758. *Syst. Nat.*, 10th Ed., pág. 594 (Europe).
Sphaerophoria scripta (Linnaeus), Macquart, 1829. *Soc. Roy. des Sci., de l'Agr. des Arts, Lille, Mém.*, 1827/1828, pág. 218, lám. II, fig. 3.
Sphaerophoria brunettii Joseph, 1967. *Oriental Insects*, t. I, págs. 243-244, figs. 1, 2 (Srinagar in Kashmir) (New synonymy).

The terminology used in describing the genitalia is that of Metcalf (1921).

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